

First record of *Takydromus sikkimensis* Günther, 1888 (Squamata, Lacertidae) from Nepal

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Abstract

We report the first record of Sikkim grass lizard, *Takydromus sikkimensis* Günther, 1888 in Nepal based on morphological characters such as the presence of four pairs of femoral pores, 12 rows of ventral scales, tail more than 3.6 times longer than snout-vent length. Our record of *T. sikkimensis* at Miklajung, Morang district represents the western-most observation of the species, ca. 94 km west of its type locality, Sikkim, India and is the first in Nepal for this species, genus, and family. This record is from Chure/Siwalik hill range which lies outside of Nepal's protected area network. This species is listed as Endangered by the International Union for Conservation of Nature and Natural Resources and warrants detailed inventory and immediate conservation interventions.

Key Words

biodiversity hotspot, central Himalayas, Chure, lizard, new records, Reptilia, Siwalik hills

Nepal is a small landlocked country which encompasses the central Himalayan Biodiversity hotspot characterized by a high diversity of species, habitat types, and ecosystems (Schleich and Kästle 2002; Shah and Tiwari 2004). Nepal is home to 158 species of reptiles, around 25% ($n = 40$) of which are lizards (Uetz et al. 2022). Studies of taxonomy and ecology of herpetofauna in Nepal are scarce (Gautam et al. 2020); however, recent studies have recorded seven new reptile species for Nepal (Pandey 2015; Bhattarai et al. 2017, 2020; Pandey et al. 2018; Rawat et al. 2019, 2020; Rai et al. 2021) suggesting that many species of reptiles are yet to be formally recorded from Nepal.

The grass lizard genus *Takydromus* Daudin 1802 represents 24 species globally (Uetz et al. 2022) with distribution mainly in Bangladesh, Cambodia, China, India, Indonesia, Japan, Korea, Malaysia, Laos, Myanmar, Russia, Taiwan, Thailand, and Vietnam (Wang et al. 2019; Uetz et al. 2022). The Sikkim grass lizard *Takydromus*

sikkimensis was named in 1888 by A. Günther based on the collection and description of lizards from Sikkim, India (Stoliczka 1872; Bhupathy et al. 2009). Later, subsequent researchers (see Boulenger 1890, 1917; Smith 1935) doubted its occurrence in Sikkim and considered it as *T. sexlineatus* Daudin, 1802. However, Bhupathy et al. (2009) revalidated and resolved the taxonomic identity of *T. sikkimensis* based on the resemblance of specimens from the Teesta valley, Sikkim to the characteristics mentioned by Günther (1888).

India's Sikkim state lies adjacent to Nepal, yet no lizards belonging to the genus *Takydromus* or members of the family Lacertidae have previously been reported from Nepal despite the availability of suitable habitats similar to those in Sikkim. Here, we report the first record of *T. sikkimensis* from the Chure hills of Nepal's Province-01, as a new Nepalese record for this species, genus, and family (Fig. 1).



Figure 1. Full body photo of *Takydromus sikimensis* from Miklajung, Morang Nepal. Photo by Bivek Gautam.

On 8 September 2021, at 15:35 h; the first author observed a specimen during diurnal herpetological surveys in Chure hills of Miklajung, Morang district, Province-01, Nepal. On close observation, it appeared different from other local lizard species known from the area by having a long tail and greenish belly part. This animal escaped when approached. Another individual was sighted ca. 03 km east of the earlier location on the 9 September 2021. The specimen was found in tropical mixed *Schima-Castanopsis* forest habitat in the upper Chure hills (Chettry et al. 2021) at 720 m msl. The lower grassy vegetation of the locality is characterized by *Microlepis speluncae*, *Brachiaria ramosa*, *Cyathea spinosa*, *Pteris biaurita*, *Cynodon dactylon* (Ojha and Niroula 2021). The specimen was captured by hand, photographed, and measured with vernier callipers; scales were also counted. After collecting morphometric and meristic data, the specimen was released at the point of capture (Fig. 2).

The diagnostic characters of the specimen were examined and measured following Wang et al. (2019) such as chin shields; femoral pores; infralabials; supralabials; ventral scale numbers, counted longitudinally from the posterior margin of collars to the anterior margin of pre-cloacal scales; ventral scale rows, counted transversely at mid-body; head length (from tip of snout to anterior margin of ear opening with claw); head width (measured at the broadest point); snout-eye length (from tip of snout to anterior margin of eye); snout-vent length (from tip of snout to anterior margin of cloaca); tail length (from cloaca to tip of tail). Morphological data were compared with the literature for *Takydromus sikimensis* (Günther

1888; Bhupathy et al. 2009); *T. khasiensis* Boulenger, 1917 (Boulenger 1917; Smith 1935; Das and Das 2017), *T. haughtonianus* Jerdon, 1870 (Günther 1888; Smith 1935; Bhupathy et al. 2009).

The specimen showed a brown dorsum and tail. The throat and ventral side of the body was pale yellow. The snout-vent length measured 36 mm, tail length -130 mm. The specimen had 12 ventral rows at midbody and 32 longitudinal ventral scales, four enlarged keeled dorsal scale rows at midbody and four pairs of femoral pores. The specimen had six supralabials on both sides, fifth in sub-ocular position; five infralabials on both sides; three pairs of chin shields, the posterior being the largest. The head length and head width were 10.8 and 5.4 mm respectively. Our record of *T. sikimensis* in Nepal is ca. 94 km west of its type locality from Sikkim, India (Fig. 3).

Our specimen showed characteristics usually associated with *T. sikimensis* and different from other *Takydromus* species found in India. For example, it had four pairs of femoral pores versus two or three pairs of femoral pores as found in *T. khasiensis* (Boulenger 1917; Smith 1935; Das and Das 2017); a tail more than three times longer than SVL in *T. sikimensis* versus approximately twice as long in *T. khasiensis* (Bhupathy et al. 2009). Our specimen differs from *T. haughtonianus* by having lower number of chin shields (three versus four), fewer keeled dorsal plates (four versus six) and a higher number of femoral pores (four versus one or two) (Günther 1888; Bhupathy et al. 2009). Our specimen differs from *T. sexlineatus* by having higher number of femoral pores (four versus two to three) and more ventral scale rows (12 versus 10) (Günther 1888; Bhupathy et al. 2009).

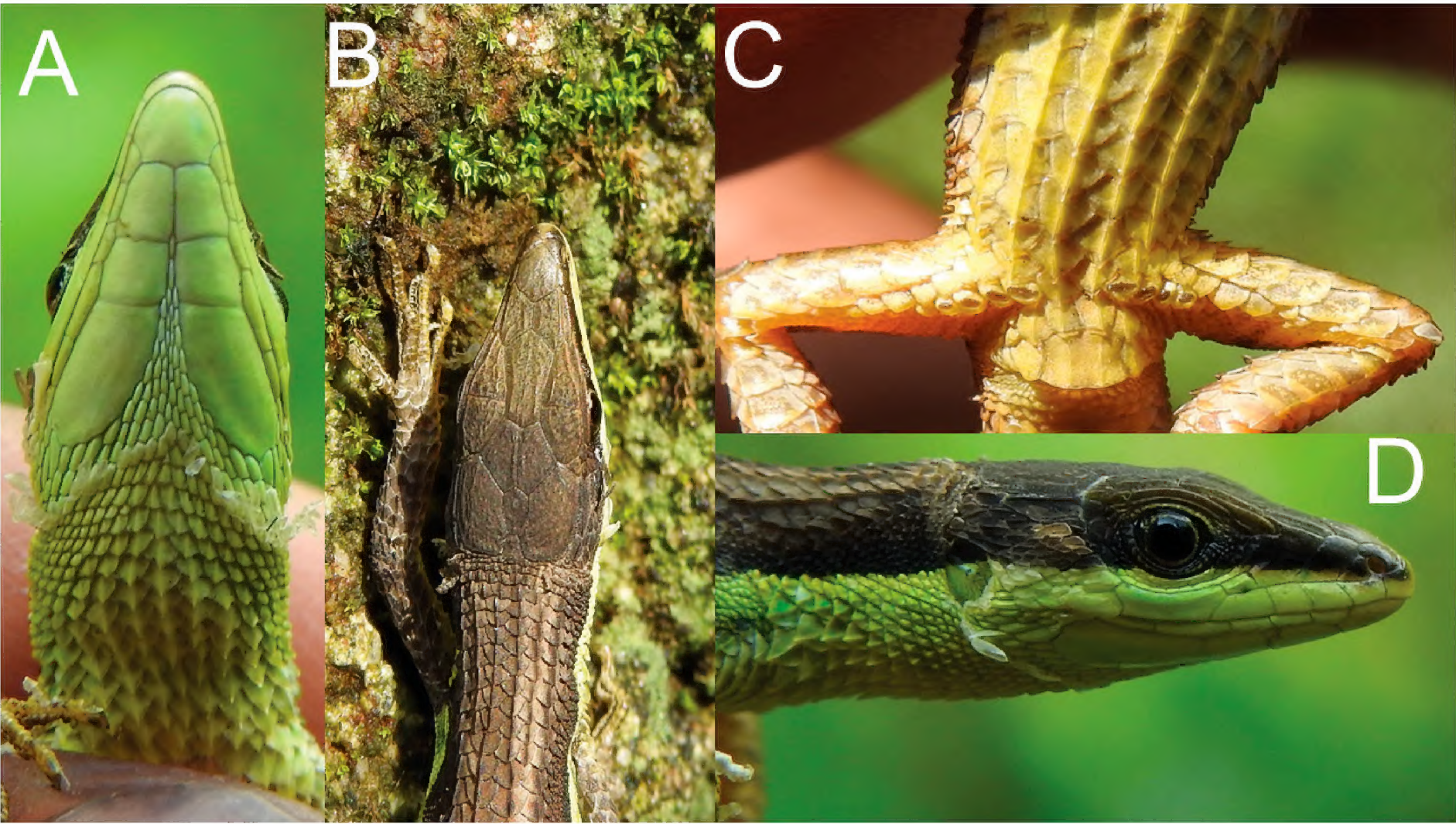


Figure 2. Morphological characters of *Takydromus sikkimensis* specimen found in Nepal: **A.** Three pairs of chin shields; **B.** Dorsal view of head; **C.** Four pairs of femoral pores and **D.** Lateral view of head. Photos by Bivek Gautam.



Figure 3. Map showing distribution of *Takydromus sikkimensis*.

The Chure or Siwalik hills are one of the youngest mountains of the Himalayan chain, extending from Indus River in Pakistan in the west through India and Nepal in the west and centre and to the Brahmaputra River in the

east in India. These hills represent one of the largest fluvial deposits in the world (Wadia 1926). They run parallel to the high Himalayas forming the first mountain range from the Terai, the Gangetic flood plain of southern Nepal



Figure 4. Habitat of *Takydromus sikkimensis* in Nepal.

(Subedi et al. 2021). Geographically, the Chure hill range covers 12.8% of Nepal's area. However, the biodiversity of the area is poorly documented (Chettry et al. 2021). Fewer studies have been conducted in recent years in Chure hills but they have occasionally resulted in a new herpetofauna species record such as *Varanus salvator* (Laurenti, 1768) and *Hydrophyllax leptoglossa* (Cope, 1868) from Nepal's eastern Chure (Bhattarai et al. 2020). In addition to *T. sikkimensis*, we also recorded other associated reptile species such as snakes; *Coelognathus radiatus* (Boie, 1827), *Dendrelaphis tristis* (Daudin, 1803), *Lycodon aulicus* (Linnaeus, 1758), *Oligodon albocinctus* (Cantor, 1839), *Psammodynastes pulverulentus* (Boie, 1827), *Rhabdophis helleri* (Schmidt, 1925), and lizards such as *Calotes versicolor* (Daudin, 1802), *Cyrtodactylus* sp. *Hemidactylus* sp. *Eutropis carinata* (Schneider, 1801), *E. macularia* (Blyth, 1853), *Varanus bengalensis* (Daudin, 1802).

The record of *T. sikkimensis* from eastern Chure indicates that detailed inventory will reveal unexplored species. *Takydromus sikkimensis* has been categorized as Endangered in the red list of the International Union for Conservation of Nature and Natural Resources (Das and Ghosh 2021) suggesting immediate conservation actions because of continuing decline in the extent and quality of its habitat due to agricultural activities and construction of hydroelectric dams. The extent of occurrence (EOO) calculated for this species is 2200 km² with the majority of the area non-protected forests and within agricultural landscape, with narrow distribution band. The

approximate EOO calculated based on elevation and habitat types (Chettry et al. 2021). A recent global assessment of reptiles (Cox et al. 2022) revealed that one of every five reptile species is facing extinction risks, and that risk is highest for reptiles inhabiting forest habitats outside of protected area systems. Our current location of record for *T. sikkimensis* in Nepal (Fig. 4) is outside of the Protected area network where conservation, research and management activities for wildlife are negligible. This could be one of the reasons that the *T. sikkimensis* remained unrecorded until now. The Chure range in Nepal is also facing threats such as unregulated gravel and stone quarrying, habitat fragmentations by ongoing provincial highways, expansion of rural towns along with roads and over exploitation of forest and water resources. Therefore, we suggest detailed conservation research of this endangered lizard to better understand its distribution, habitat characteristics and natural history in eastern Chure, Nepal.

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